



North Carolina

DEPARTMENT OF TRANSPORTATION

NCDOT Rail Division Rail Safety Initiatives

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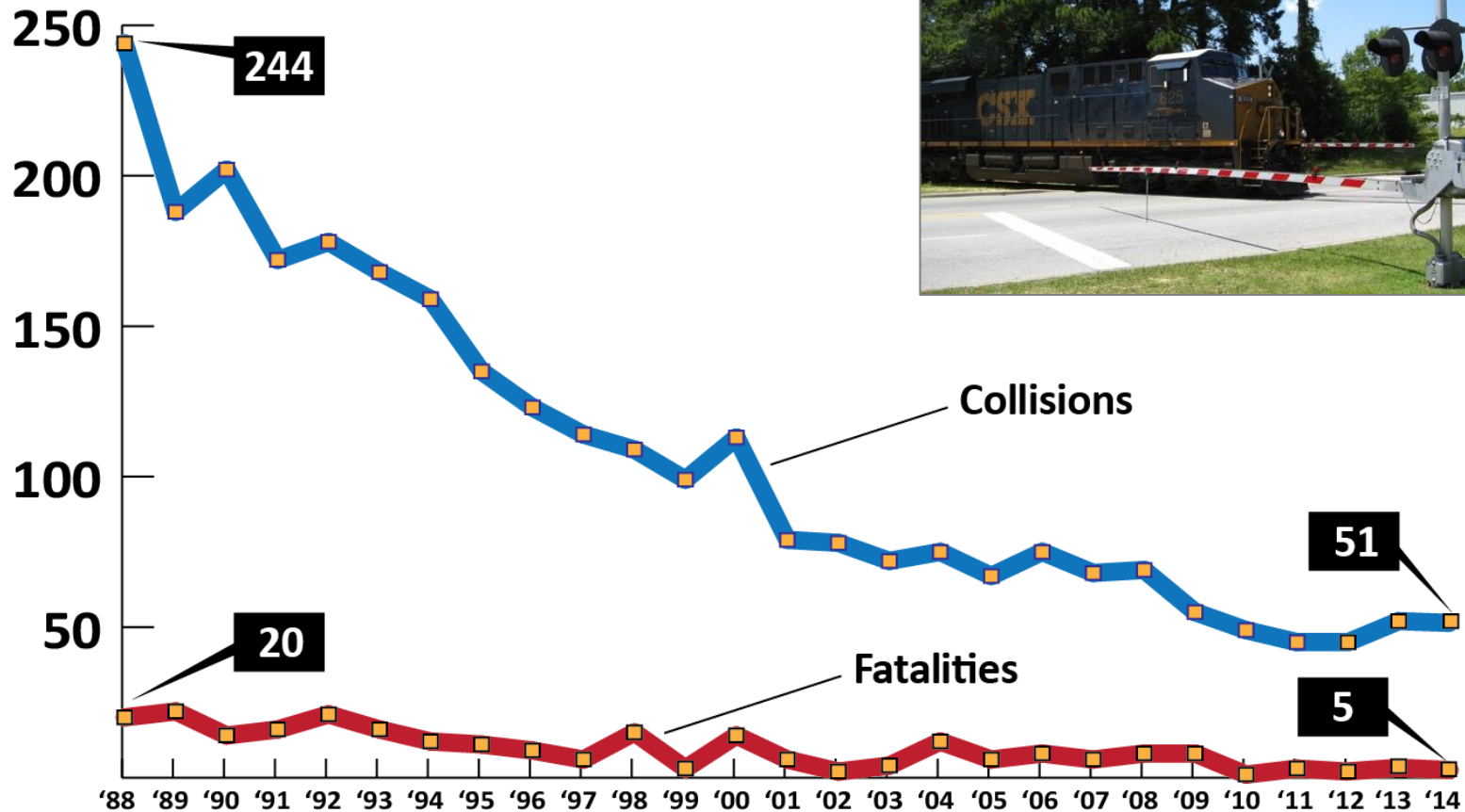
May 6, 2015

NCDOT is Focused on Safety

- Railroad Safety Oversight Partnership With FRA
- State Fixed Guideway Safety Oversight With FTA
- Internal and External Safety Outreach & Training
- Crossing Safety Studies
- Inventory & Data
- Crossing Signals & Devices
- Use of New Technologies



Safety Improvement Results



Installing crossing signs, signals and gates, and building bridges to separate train and vehicle traffic = fewer crossing incidents

Sealed Corridor Program – First of its kind in US

Goal: “Seal” or protect every public rail/highway crossing to improve safety along high-traffic Charlotte to Raleigh corridor

- Federal funding, state matching funds
- Extensive testing to determine most effective tools – *median separators, longer gate arms, four quadrant gates and other signage or traffic control devices*
- 189 crossings treated from 1994-2004
- Incidents reduced
- Those that did occur involved drivers going through or around gates



Early photo of four-quadrant gate test

Traffic Separation Studies

Evaluate all public at-grade crossings along a corridor or within a municipality

- Process identifies and sets framework for projects (such as Piedmont/Sealed Corridor)
- Recommendations can include crossing consolidations and associated mitigation projects, grade separations, signal upgrades and recommendations for roadway improvements
- Partnership with municipalities, MPOs, railroads with public input
- Implementation plan includes near, mid and long-term improvements





Piedmont Improvement Program

- ***Build 12 grade separations***
- ***Allows for closure of 24 public & 16 private crossings***

Upper Lake Road Bridge opened to traffic in October 2014.

07/30/2014

Dynamic Gate Operations with Vehicle Detection at 4-Quadrant Gated Highway-Rail Crossings

- FRA Grant-funded Technology tested by NCDOT and ITRE
- All gates drop “near-simultaneous” to quickly seal the crossing from vehicles entering late
- Provides a stronger physiological stimuli for obedience to the warning devices
- BUT, if vehicle does enter the crossing at the beginning of entry gate descend, **system will detect vehicle and hold exit gate up**, thus, not trapping the vehicle in the crossing
- Uses radar detection rather than in-pavement loops.



Installation testing shows exit gate still up to allow for truck to exit

Vehicle Detection Systems Online, More Coming



- Will be installed at eight additional locations through use of FRRCSI funding
- Viewing crossing operations has provided engineers opportunity to optimize traffic signal phasing so that motorists do not stop on tracks
- Evaluating possible use of system communication options to notify Traffic Control Centers when vehicles are on the tracks



Initiatives to Reduce Trespasser Incidents

NO TRESPASSING

Trespassing on Railroad Property
is **Illegal** and
You are Subject to **Arrest**

NC General
Statute 14-280.1



Class 3
Misdemeanor

Traspasar la propiedad
del ferrocarril es **ilegal** y
usted podría ser **arrestado**

PROHIBIDO PASAR

Study with NCDOT and NCSU

- Identify where trespassing occurs
- Map these areas
- Identify practices and technologies to reduce trespassing incidents

New sign developed

NCDOT's BeRailSafe Program

Provides ongoing education and training to:

- Community and civic groups
- Kids and school groups
- Internal groups NCDOT (e.g. division personnel preconstruction, work zone groups)
- Local and state law enforcement
- Firefighters, EMS and other first responders
- Judges and district attorneys



From Selection to Construction

FRRCSI Projects

- Projects scored under Rail Program Guidelines
- Close or improve crossings



Federal-Aid High-Rail Grade Crossing Program Selection (Section 130)

- Priority-based, data-driven selection process
- Requires prioritization model

Rail Division “Investigative Index” Model

- Prioritizes signals/gates & individual closures at grade crossings
- Uses highway and railroad operational & physical data
- Uses 10-year crossing crash history
- Effectiveness equivalent to USDOT Crash Prediction Model

NCDOT's Current Priority-Based Project Selection

Strategic Transportation Investments (STI)

- Prioritization under NCDOT policies/procedures
- Data model developed to represent rail mobility & capacity projects relative value
- Current STI model has gained wider acceptance with NCDOT Prioritization staff
- Working under budget constraints



Where We Stand

Many projects are finished or underway, but there is still a lot of work to be done

- Rail has built crossing inventory, GIS and data systems
- Working to utilize those systems to improve selection process through Cost/Benefit Model
- Makes scoring mechanism even stronger by evaluating the **cost benefits** of improvements
 - Monetizes rail & highway delays & highway traffic rerouting in addition to direct injury & property costs
 - Initial development for safety projects – individual & corridor signals/gates & closures
 - Scalable & flexible for application to mobility & capacity corridor projects

Elements of Crash Cost

Primary Effect Costs

Direct, indirect, and intangible costs associated with property damage, injury, and fatal crashes (more visible at the time of the crash)

- Injury and Fatality cost
- Highway vehicle damage
- Rail Infrastructure Damage
- Rail Equipment Damage
- HazMat release cost



Secondary Effect Costs

Costs accrued to delayed travelers and cargo, and to parties beyond the immediate road and rail travelers and service operators (less visible at the time of the crash)

- Delay and Rerouting Costs
- Supply Chain Transport Costs
- Supply Chain Inventory Cost

Rail Division Safety Team

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